* NOTICES *



1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
This invention relates to the base (substrate) equipped with at least one integrated circuit made of paper. This kind of base is known from German patent application DE-19601358, and is used for the security document (security document) or the bank note (banknote) for the defense to a forgery or fraud. This well-known base contains the integrated circuit which has data which were built into that base and defined beforehand. The integrated circuit could be read in remote non-contact, and is combined with the base with the immobilization system. The integrated circuit used for this base is, the conventional integrated circuit, i.e., silicon mold known well. The chip size manufactured first decreases by etching and polishing, consequently a chip serves as desirable thickness being incorporated in the body of paper (paper mass). In order to prevent the damage over a crystalline circuit, an integrated circuit is reinforced as supporters (support layer) need to help, and it is useful also to positioning of an integrated circuit. Furthermore, the integrated circuit is covered with the protective chemistry resistance layer. It is a fault at the time of lack of the flexibility in this silicon chip known well putting in this kind of base into a bank note or social position bonds, and using it as a security paper (security paper). In addition, the additional production process for making it the suitable dimension for the extra layer and list which should be included too much has caused excessive increase of the cost costs in the base of this property.
[0002]
An integrated circuit is incorporated in the base which used as the parent paper used for a security document, a bank note, and such a thing, and the purpose of this invention has this base in offering what does not have the above-mentioned fault.
[0003]
According to this invention, the purpose is attained when the integrated circuit in the base of the above-mentioned type contains a semi-conductor organic polymer. This means the contents (contents) programmed in order to direct a specific function to the electrical circuit arranged by the polymer and it. The polymer chip of this property is high flexibility, and, so, is notably suitable in the use to a security document like a bank note. Even the sharp fold in the chip produced from the organic polymer of semi-conductor nature does not bar the function of the chip. In addition, a polymer integrated circuit (polymeric ICs) can carry out direct production at a desirable dimension, especially the desirable dimension about thickness, and its cost of the chip of this property is [ about about 1/10 ] lower than the minimum current price about the chip of a silicon mold.
[0004]
In the polymer chip, the base material of non-conductivity which makes the polymer matter of semi-conductor nature deposit on a front face determines the thickness of the whole integrated circuit substantially. : with sufficient using a powerful insulator mechanically preferably -- especially the plastics with the interaction between powerful intramolecular or a molecule is suitable for this purpose.
[0005]
Using the integrated circuit of this property for the object similar to a security paper or this as a security mark offers a new and powerful safeguard. It is because it is too complicated for a forger to produce these integrated circuits and it is what endures their knowledge and capacity generally you to be Haruka.
[0006]

As implications in the inside of the context of this application, it is understood by the paper in which paper is made from nature or a synthetic fiber, and the list that the paper made from plastic film current is meant, and those papers are used for them by manufacture of a security document, a bank note, and such a thing.
[0007]
An integrated circuit can be made into one or the number beyond it, and may be fitted to the demanded function. For example, even if it can incorporate more than two or it of a polymer chip of the same kind for the purpose of the certainty of actuation, consequently one of those chips stops operating, the final product made from the base and/or these is still usable.
[0008]
desirable -- the above-mentioned organic polymer -- a conjugation polymer -- especially -- low -- polymerization pentacene (oligomeric pantacene), Pori (thienylene vinylene), or Polly 3 It is chosen from an alkyl thiophene. The integrated circuit produced from one sort of these ingredients is indicated by Brown and others Science, 270, pp.972-974, and 1995.
[0009]
Although it will be understood by this contractor, the plastic IC used for this invention contains another additional layer besides the polymer layer of semi-conductor nature. For example, a base may be produced from polyimide, two or more blocks of the poly aniline are formed in the front face, and they function as the source or a drain. The polymer layer of semi-conductor nature exists in those front faces, for example, Pori (thienylene vinylene) is included. It is the gate as this polymer layer is covered with the insulating layer which consists for example, of a polyvinyl phenol and one poly aniline upper layer is the most significant.
[0010]
In the operation gestalt of the base by this invention, the integrated circuit can be deciphered in non-contact, and data transmission is finished by the dielectric or the capacitive root so that it may be known by the conventional technique.
[0011]
If it is dielectric read-out, the coil is required because of a current supply source, and must connect it in conduction to an integrated circuit. Read-out becomes possible from the place which distance left by it. In order to make read-out by small distance possible, an integrated circuit is contacted to a conductor and a conductor produces electrostatic capacity (capacity) with a measuring device there. A current supply source and read-out become possible by it.
[0012]
According to other desirable operation gestalten of this invention, the security thread is equipped with the direct or indirect contact for read-out and a current supply source including the conductive security thread by which the base was connected to the integrated circuit. In those desirable operation gestalten, although it is metalized in order that a security thread may give the demanded electric conductivity (metallized), the location of a polymer nature integrated circuit interrupts deposition of the metal, and excepts it from metalization. In the case of a direct current supply source, the metal must be connectable. The technique of enabling grant of this ease of connecting contains the part which can connect through the so-called aperture by the security thread included in the base, the security thread incorporated by the list into the base, and its metal part. One or the integrated circuit beyond it is advantageous in it being the part of a security thread. The thickness of this security thread may be fitted to use into the application for which that base was meant, for example, a bank note. In a bank note form, the range of the thickness of a paper base is usually 100 micrometers or less. In this case, as for the thickness of a security thread, it is desirable that it is in 15 - 60% of range of the thickness of the base concerned. For example, if a paper base has other thickness about covering of an identification card like a passport, about 10-micrometer security thread which is the minimum thickness will be applied. By bigger thickness than 100 micrometers, it becomes comparatively meaningless at use into a security paper. The desirable operation gestalt of the polymer integrated circuit in the gestalt of a security thread gives two or more additional security features (security features) which may be easily recognized by the public. The thread containing an integrated circuit may include additionally some of other descriptions like coloring matter, fluorescence or phosphor, photogene, and a printing index.
[0013]
Although organic and a conductive polymer can also be used for the current supply source to a chip, supposing it considers as direct contact, generally the mechanical contact property of these polymers will not yet be desirable.
[0014]

The easy security thread which consists of a conductive polymer is advocated by European Patent application EP-A-0753623 No. However, the thread of this property has only the electrical conduction-property. It is the approach which is equal to the conductive polymer thread into which there is no property of a semi-conductor and the integrated circuit was so built, and it is also unstorable to use a code. the security thread containing the integrated circuit of this invention being the conventional way, for example, incorporating completely or being accumulated into the body of paper, -- the inside of an aperture -- or it can arrange by making it adhere on the surface of a document. When the protection to the attack from chemicals is required, chemical resistance and an electric non-conductive protective layer can be used to the conductive organic polymer of a chip.

[0015]

As for a polymer chip, itself must not necessarily be completely laid underground into paper like [ in the case of the silicon chip in the above-mentioned German patent application ]. Alternatively, a polymer integrated circuit can be arranged on the surface of a base, and the conventional technique about adhering the foil (foils), a hologram (holograms), other optical-activity components, and such a thing is used for it.

[0016]

An integrated circuit is convenient though itself constitutes the part of all kinds like the foil, a patch (patchs), a hologram, or KINEGURAMU (kinegrams) of optical-activity component, and it is given to the inside of a base, or a base front face as two or more additional security features. As the security thread was already described, according to other desirable operation gestalten, direct or capacity-either can form the optical-activity component of this property, as two conductive parts into which those components were made to divide electrically function for read-out and a current supply source. The conductive part can consist of a metal, conductive polymers, or those combination.

[0017]

Including the code by which the integrated circuit was beforehand programmed for the defense purpose, before the code builds a chip into a base, it is given.

Preferably, an integrated circuit contains the code of a property peculiar to the base which incorporated the circuit into it.

[0018]

In a current technical condition, on the other hand, a polymer integrated circuit may be used only for tropism, namely, one writing or a program is possible for it. The desirable storing technique of the code into an integrated circuit is using the technique brought about from the code creation way. If it is it and the attested code is stored into an integrated circuit with the method of encryption, if decode carries out not knowing of the private key, it will become impossible. Therefore, even if it obtains a non-written in chip by the unsuitable method, the strong barrier powerful [ the private key ] and de facto will be formed, and it will bar reading that a forger applies a message to a security document, and the message concerned. The defense is performing partial programming of the chip performed to arbitration, after an integrated circuit's becomes a part of security document, and the further amelioration is also possible for it so that it may explain in full detail further below.

[0019]

The configuration of a polymer chip is not important. If current and the handy number of bits are stored in an integrated circuit, the surface dimension whose dimension of about 1mm is the limitation of smallness is expressed about a rectangle. Generally a 4mmx6mm integrated circuit holds about 48 bits, 2 bit/mm2 [ i.e., ], with a rectangle. As for the ratio (namely, die length to width of face) of the surface dimension about a polymer chip, it is desirable not to exceed 10:1, and this is for the chip which has the big ratio which is not desirable as a result to increase. Possibility of saying that the small dimension of an integrated circuit is covered using the additional description customarily used for the conventional technique is offered. The dimension of such an additional description is a comparable size generally at the dimension of a polymer integrated circuit. So, even a big integrated circuit with sufficient memory capacity which can store a lot of data is usable, without spoiling the appearance of a security paper. If other security marks and the combination of a chip are arranged on the front face of a security paper, the corroboration that inconvenient the current supply source to the chip and read-out are not influenced according to the additional security feature of this property is needed.

[0020]

The base containing the polymer integrated circuit of this invention is used as a security paper in other security documents like a bank note, a passport, an identification card, and a security.

[0021]
Development of an integrated circuit with this cheap property gives new possibility in ****** to prevention of forgery of a security document, and begins from the electronics completely new type in a security paper (electronic bar code).
[0022]
Although the examples of the use of an integrated circuit made into the security feature in the document mentioned later are various possibility of being related with a bank note, it does not come out so much and the same possibility exists also about a passport, an ID card, and a security document document such type [ other ].
[0023]
The 1st possibility is related with use of the integrated circuit which is in the base made from paper and was programmed completely beforehand. Including one or the code beyond it, desirably, the integrated circuit is an encryption gestalt and relates to the bank note. This information may contain a price, a country, a location, the time of manufacture and a serial number, and/or such a thing. the information on each chip is substantial about specific worth of a bank note -- that is [ identity ], in a price, a country, and a list, are a **** manufacturer and/or a printer mostly, differ partially, namely, occasionally they are a paper manufacturer and/or a printer at manufacture time of day, a serial number, and a list.
[0024]
Still more nearly special protection is obtained in a peculiar code (first code) and additional second code. This second code is the translated version which enciphered the first code. Encryption is performed using a first key. When collating, a second code is read and the relevance enciphered to the first code is collated using a second key. The front stirrup by which, as for a second code, a chip is arranged to a base can be behind given to the chip. The code system of this property is indicated by WO-A -97/No. 24699 as an example.
[0025]
In this well-known system, a code is carried out, and it is enciphered and the peculiar property of an object is decoded. About a bank note, a surface characteristic is given to a specific location, a code is carried out, and it is enciphered, and is recorded as a printing pattern (printed pattern) on the surface of a bank note. When collating, the printing pattern and surface characteristic are mutually compared using a second key. Many of other properties are used for the base like the property arranged arbitrarily by the advanced technology about protection of a security document, and especially refer to WO-A -91/No. (grain direction) 19614, GB-A -230407 (reflexibility flake), US-A-4218764 (magnetic powder or fiber), and WO-A-87/01845 (conductive fiber) for them. In all these cases, the property of a document arbitrary and peculiar so is used for collating. Since a code (enciphered) was stored despite former, it did not exist, therefore the coding property was always stored by other approaches, for example, the useful and suitable chip for the use to the base of paper is the own outside of a document, or was magnetically recorded on the inside of a document, or a front face in printing or them. The polymer chip currently used for the base of this invention makes it possible technically to store in the interior of a document using the description of those protection.
[0026]
The fluorescence property of the fluorescence fiber arbitrarily arranged within limits as which the bank note was determined beforehand can turn into a suitable property. However, it is measurable and other properties arbitrarily arranged on the interior or a front face can be used. Conditions are that the used property must be stable through the whole life of a document, and a certain property that this is severely influenced by dirt, contamination, a wrinkle, and the result of such use means a thing unsuitable on a principle.
[0027]
The coordinate of the part relevant to determining the arbitrary property in a bank note and the direction which the front face will inspect if required can also be stored in a chip. Therefore, when collating a bank note, a specific parameter is measured along the path (path) appointed beforehand. Or although the image of the whole bank note is taken, the assessment is still performed only using the data in the coordinate by which the code was carried out beforehand. It is compared with the code memorized and the result of this measurement refers for it to the same, same location and the same, same property. The signal of refusal or consent is generated based on this comparison. This comparison can also be enciphered to arbitration.
[0028]
The base with the polymer integrated circuit of this invention can include the further conventional security feature. For example, it is the standard technique used in order to space and to determine these descriptions as **, such as a security

thread, an optical-activity component, and special chemicals, a contraction photographic print, and a list.
[0029]
This invention also contains the integrated circuit with which these were produced from the organic polymer of semi-conductor nature in relation to a security thread or an optical-activity component.
The following example illustrates this invention. In this case, the specific fluorescence property in the specific part of a document is used as an example. The fiber of high fluorescence which emits the light of a different color is given to many bank notes how many. These fiber is in the arbitrary arrangement which made the document penetrate. The code of the local fluorescence various type by fiber can be carried out in the part defined beforehand, and it can store in a chip in digital ones by the encryption gestalt alternatively. A document is manufactured by this and coincidence, namely, it is performed between the manufacture phase of paper, or the printing phase of a document. When collating, the range under inspection is again read using the coordinate and bearing which were stored in the chip, and the result is compared mutually and then it serves as refusal or consent. The above-mentioned coordinate differs from bearing with another bank note respectively generally, consequently collating becomes a best thing uniquely completely for the above-mentioned document. It is because an arbitrary property and an arbitrary coordinate are peculiar to the document. In this point, including a peculiar code, the chip of a respectively different bank note is equivalent to fingerprints, if a part [ **** / the bank note under inspection ] says. The code of the peculiar property may be stored with the gestalt of encryption or un-enciphering [ either ].
[0030]
As already mentioned above, use of the base of this invention is not restricted to a bank note. About other use like a passport and identification cards, it has, and since [ being lawful ] a digital code is generated and this is stored in the integrated circuit of a document, the part of the main biometrics-properties can be used. Probably it has, the code of the part of the main digitization photographs could be carried out, and the parameter by which the code was carried out to the proper about each document could determine the part with such one lawful example which should digitize. The storage code of a photograph and the code which is actually read and is mutually in agreement are chiefly required of collating of a document about the above-mentioned example. Other biometrics-parameters can be used and a thing [ like / fingerprints or / a part of / those ] is stored with the gestalt coded in the polymer chip. It is coded also here and the stored description needs a stable thing.
[0031]
An attached drawing is referred to in order to explain this invention furthermore.
Drawing 1 shows the outline top view of 1 operation gestalt of the bank note by this invention.
Drawing 2 shows the sectional view which met the I-I line of the bank note of drawing 1 .
[0032]
Drawing 3 shows the outline top view of other operation gestalten of the bank note by this invention.
Drawing 4 shows the enlarged drawing of the optical-activity component currently used for the bank note of drawing 3 .
Drawing 5 shows the sectional view of the optical-activity component of drawing 4 .
[0033]
Drawing 6 shows the sectional view of the operation gestalt of further others of the bank note by this invention.
Drawing 7 shows the operation gestalt with a polymer chip of further others of a security thread.
[0034]
Drawing 8 shows the operation gestalt of further others of an optical-activity component with a polymer chip.
Drawing 9 shows the combination of a polymer chip and a security thread.
Drawing 10 shows the operation gestalt of further others of the security thread by this invention with a sectional view.
[0035]
In each drawing about which it argues below, what is shown using the same reference mark should be noticed about the same configuration.
Drawing 1 shows the bank note 1 produced from paper. The bank note 1 has the security thread 2 including the chip 3 produced from the organic polymer of semi-conductor nature, and the conductive metalization part 4. Furthermore, as for the bank note 1, it is similarly produced from the organic polymer of semi-conductor nature including second chip 3'. The security thread 2 is arranged on the front face of paper 5, it is one of these and second polymer chip 3' is laid underground in the body 5 of paper so that it may understand from the sectional view of drawing 2 . Chip '3' laid

underground is making the conductor (conductor) or the coil contact, in order to perform a required current supply source and required read-out.
[0036]
Drawing 3 shows other operation gestalten of a bank note 1, and, as for the security thread 2, this is also incorporated in the body of paper including the polymer chip and the conductive part 4 in it. Each partition of the conductive part 4 is connectable through the aperture 6, in order to perform direct electric contact, when wished. As for it, the bank note 1 shown in drawing 3 is also located just under the optical-activity component 7 in this case including second chip 3'. The strip 9 has insulated the optical-activity component 7, for example in non-electrical conduction including the conductive part 8 divided by the strip 9. Chip 3' has kept the distance which minded capacity coupling directly, and is in a gap, and the electric power supply and reading which passed through the conductive part 8 are possible for it. A conductive part can be covered with a chemical inertness layer if reading is performed in capacity. If direct contact is required, the whole part and whole strip 9 of a conductor can be covered, and although this protects an integrated circuit and a conductor (non-conductive metal), other parts of a conductor will be given by approach which keeps connected by direct contact.
[0037]
Drawing 4 is the enlarged drawing of the optical element 7 equipped with chip 3', and drawing 5 is the sectional view of the optical element 7 of this property.
Drawing 6 shows other operation gestalten with the chip and the conductive part 4 which were produced from the organic polymer 3 of semi-conductor nature of the security thread 2, and it is used to the front face of paper 5. In this operation gestalt, each partition of the conductive parts 4 of a polymer chip and the security thread 2 is protected by the layer 10 of a non-conductivity ingredient electrically [ chemical resistance ]. A protective layer 10 may cover the whole thread, when capacity coupling is used.
[0038]
Drawing 7 shows the operation gestalt of further others of the security thread of this invention, in it, a chip 3 does not form the part of the security thread itself, but contiguity arrangement of it is carried out rather at it. As for each conductive part 4 of the security thread 2, each other is electrically insulated by the insulating block 11. The chip 3 touches through the electric conductor 12 to the conductive part 4 in which a security thread participates.
[0039]
Drawing 8 shows an operation gestalt same type about an optical-activity component. The electric conductor 12 supplies electric contact between the conductive part 8 of an optical-activity component, and polymer chip 3'.
[0040]
Drawing 9 shows the combination with the optical-activity component 7 of the security thread 2, and each metal part 4 of the security thread 2 and each metal part 8 of the optical-activity component 7 touch electrically. The chip produced from organic material 3' of semi-conductor nature is located just under the optical-activity component 7.
[0041]
Drawing 10 shows the operation gestalt of further others of the security thread of this invention. In this operation gestalt, a security thread consists of a chip 3 and a conductive part 13, and they are made from the conductive polymer. The security thread is arranged on the front face of paper 5. The polymer chip 3 is protected by the layer 10 of the chemical resistance matter, and it has also covered the conductive polymer 13 (each part). In order to secure the electric power supply and read-out which were very excellent, the metal block 14 adjoins the layer 10 of an insulating material, and is arranged, and the metal block 14 touches electrically to the conductive organic polymer 13.
[0042]
If it is a system using capacity coupling, an additional protective layer can be applied so that a metal part 14 and all the chemistry resistance layers 10 may be covered.
[Brief Description of the Drawings]
[Drawing 1]
It is the outline top view showing 1 operation gestalt of the bank note by this invention.
[Drawing 2]
It is the sectional view which met the I-I line of the bank note of drawing 1 .
[Drawing 3]
It is the outline top view showing other operation gestalten of the bank note by this invention.

[Drawing 4]
It is the enlarged drawing of the optical-activity component currently used for the bank note of drawing 3 .
[Drawing 5]
It is the sectional view of the optical-activity component of drawing 4 .
[Drawing 6]
It is the sectional view showing the operation gestalt of further others of the bank note by this invention.
[Drawing 7]
It is drawing showing the operation gestalt with a polymer chip of further others of a security thread.
[Drawing 8]
It is drawing showing the operation gestalt of further others of an optical-activity component with a polymer chip.
[Drawing 9]
It is drawing showing the integrated state of a polymer chip and a security thread.
[Drawing 10]
It is the sectional view showing the operation gestalt of further others of the security thread by this invention.

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[Translation done.]